Section 9.2

Measurement and Calculations

Certainty and significant digits

When communicating in science you need to be able to express certainty. There is an international agreement about the correct way to record measurements. Record all certain digits plus one.

“Certain Digits Plus One” represents the significant digit process.

<http://www.physics.uoguelph.ca/tutorials/sig_fig/SIG_dig.htm>

All digits included in a state value (except leading zeros) are significant digits

Counted or defined values represent exact values

Counted values Define values

4 dogs 1000 m in a 1 km

10 CDs 10 mm in a 1 cm

3 Blue Jays 60 minutes in 1 hour

Certainty rules

1. Multiplying and Dividing

When multiplying and or dividing the answer has the same number of significant digits as the measurement with the fewest number of significant digits.

1. Rounding

If the digit after the digit to be retained as a significant is a 5 or greater, round up.

1. Precision rule for adding or subtracting

When adding and subtracting measured values of known precision, the answer has the same number of decimal places as the measured value with the fewest decimal places.

Conventions of communication

The international community of scientists has agreed on a system of measurement called SI, the international system of units from the French; *Systeme international d’unite*). This is very useful in communicating results.

Solving Equations

When solving equations you often need to rearrange the equations to solve for different variables.

Example:

Variables:

A, b, h, values can be added, measured or found for each variable.

Defining equation

A = ½ b multiplied by h

How do you solve for each variable?

b

1. X 2: 2A = bh
2. Divide by h: 2A/h = b
3. Rewrite: b = 2A/h

h

1. X2: 2A = bh
2. Divide by b: 2A/b = h
3. Rewite: h = 2A/b

Fill some numbers in and check your answers. Prepare three examples and be ready to demonstrate on the board.

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Have students complete all understanding concepts ?s